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CFIA-ACIA

**Developing Your Biosecurity Plan: The
National Voluntary Farm-Level Biosecurity
Standard for the Fruit and Tree Nut Industries**

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1.0 Introduction

It is recognized that Canadian fruit and tree nut producers currently implement many biosecurity measures to prevent and manage pests. The objective of the National Voluntary Farm-Level Biosecurity Standard for the Fruit and Tree Nut Industries is to provide producers with a nationally consistent proactive approach to prevent the introduction and spread of pests through implementation of biosecurity measures. A nationally consistent approach to preventing and managing pests is important for Canadian producers to maintain domestic and international markets.

Biosecurity refers to a series of management practices designed to prevent, minimize and manage the introduction and spread of **pests**. This includes pests not established in Canada, pests established in limited areas of Canada, and pests widely distributed that can spread from farm to farm. Biosecurity best practices reduce the risk of pests on your farm by targeting the possible pathways of introduction, including nursery stock, soil, mulch, air, water, biological and mechanical **vectors**.

The Canadian Food Inspection Agency (CFIA) works with stakeholders to develop national voluntary farm-level biosecurity standards and producer guidance documents for several crop and animal-based sectors. The development process is supported by Agriculture and Agri-Food Canada (AAFC) under the Growing Forward 2 Agricultural Policy Framework. To ensure that what is developed is relevant and useful for producers and the sector as a whole, Biosecurity Advisory Committees (BACs) have been developed which pull together expertise from industry and producer organizations, producers, academia, and federal and provincial specialists, see Appendix 2 for partnership acknowledgments.

The National Voluntary Farm-Level Biosecurity Standard for the Fruit and Tree Nut Industries (subsequently referred to as the “Standard”) is a national reference document which provides guidance to producers to develop their **biosecurity plan**. A nationally consistent approach to biosecurity activities and awareness requires the continued partnership and commitment of the federal government, provincial governments and industry. This national standard provides a basic biosecurity framework that may be used by the provinces, industry associations and commodity organizations to develop specific awareness and implementation programs to assist the producer.

The standard is accompanied by a producer guide. The producer guide provides more detailed, commodity specific best practices and other options to be considered to achieve the risk mitigation goal identified in the standard. These reference documents

should be used with other commodity specific references that may be available from your provincial and trade associations.

1.1 Biosecurity and Integrated Pest Management

Farm biosecurity and ***integrated pest management (IPM)*** both aim to protect crop health. Many biosecurity risk mitigation strategies are synonymous with IPM preventative strategies. The two approaches differ in that farm biosecurity has a greater focus on practices intended to exclude pests from the farm or limit their spread and establishment. In contrast, IPM primarily involves strategically using different practices to control a pest that is already present in a production system or is an imminent threat¹. For example, IPM prevention activities are often more focussed on industry's best management practices such as monitoring, managing environment (for example; soil fertility and pH), and choosing trees or plants appropriate for the growing conditions.

1.2 Why is biosecurity important to producers?

The sustainability of the fruit and tree nut industries in Canada depends on the implementation of biosecurity practices to prevent, minimize, and control the introduction of pests. The implementation of farm-level biosecurity in Canada protects our environment and agricultural sector and supports our reputation as a safe and reliable trading nation. This has significant economic, environmental and community benefits for all Canadians. The development of a farm biosecurity plan will define and formalize many of the risk reduction practices that are already in place in your day-to-day operations, and assist you in addressing potential biosecurity gaps that may exist in your current operation.

The implementation of biosecurity best practices is a way to support the objectives of your farm business plan.

Effective prevention of pest occurrences protects productivity, stabilizes production costs, and protects the value of your farm land. Your farm biosecurity plan will also contribute to protecting the long-term investment in your farm operation.

¹ Farm Biosecurity/ IPM workshop <http://ipmworkshops.com.au/farm-biosecurity>

Your farm biosecurity plan may assist you in retaining customers and attracting new markets. The enhancement of biosecurity practices at the farm level will help you in addressing customer expectations, whether locally, nationally, or internationally.

Other considerations for implementing biosecurity measures and planning within a farm include:

- Maintaining market access;
- Customer demand for biosecurity practices and protocols;
- Decreasing production losses;
- Avoiding the introduction of new pests; and
- Containing and minimizing current biosecurity risks.
- Responsibilities to neighbours and industry to ensure that biosecurity risks are not spread to someone else.

1.3 Who is responsible for biosecurity?

Biosecurity is everyone's responsibility. Anyone responsible for the health of trees or plants needs to be aware of the risk and accept the responsibility of the potential impact to Canadian agriculture. Implementation of biosecurity measures by everyone will help minimize the potential risk of pest introduction and spread to protect Canada's environment, plant resource base and economy from biosecurity threats.

1.4 Who is the document for?

Biosecurity is the responsibility of everyone. It is recommended that anyone responsible for the health of plants from small farms, to large facilities, consider developing a written biosecurity plan. This biosecurity reference tool is not designed to provide guidance on the risks associated with the production of nursery stock. For guidance related to these activities please refer to the National Voluntary Farm Level Biosecurity Standard for the Greenhouse, Nursery and Floriculture Industries.

1.5 How to Use this Document

Information on pest transmission pathways, biosecurity considerations, and a glossary of terms are included in the standard. ***The terms in the standard that are defined in the glossary appear in bold and italic the first time they are used in the standard.***

The **Target Outcomes** are goals that all producers of fruit and tree nuts should try to implement to protect their trees or plants from the introduction and spread of pests.

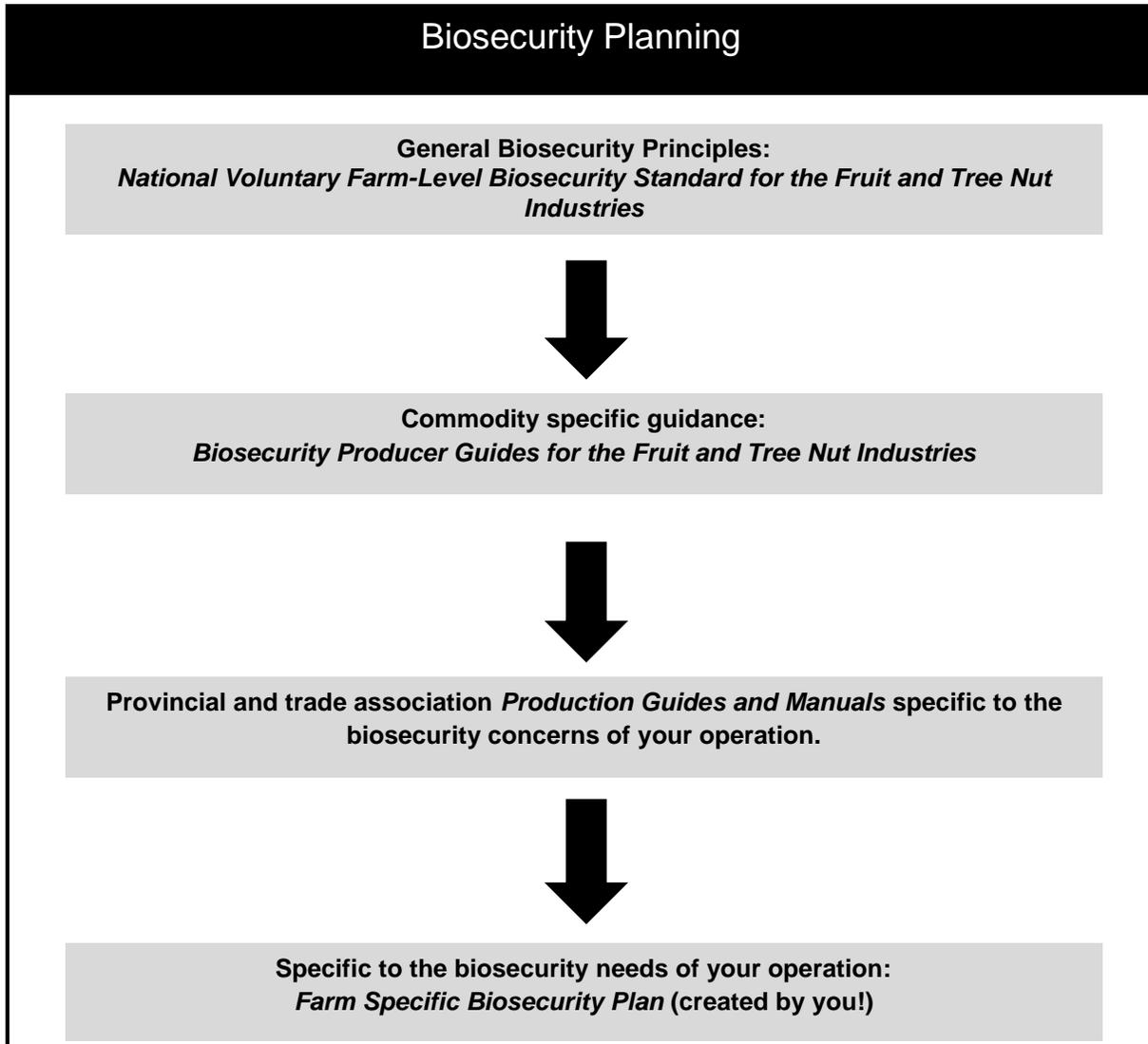
The **Benefits** sections provide the reader with details regarding why a specific target outcome is important to biosecurity.

The **Considerations** sections provide examples, guidance and suggestions for reaching the Target Outcomes. The intent is not to prescribe, but rather, to provide guidance. These are not necessarily all-inclusive, but are accepted as best management practices for the fruit and tree nut producers. They are based on an understanding of risk pathways, supporting science and time proven management practices. These are designed to be attainable and realistic.

Please note: This standard applies to a diverse group of tree fruits, berries and nuts. Not all considerations may be applicable for each commodity and place of production. To develop an effective biosecurity plan for your farm you must identify the pests of concern and analyze their pathways of transmission for your specific commodity and place of production.

This standard provides a framework for the development of individual farm biosecurity plans or to enhance but not supersede existing farm level programs, such as CanadaGAP™ and other regional or provincial programs.

Figure 1: Illustrates how the various documents and tools referenced in this standard work together to help you develop your biosecurity plan.



2.0 The Creation of a Biosecurity Plan and the Implementation of Biosecurity Measures

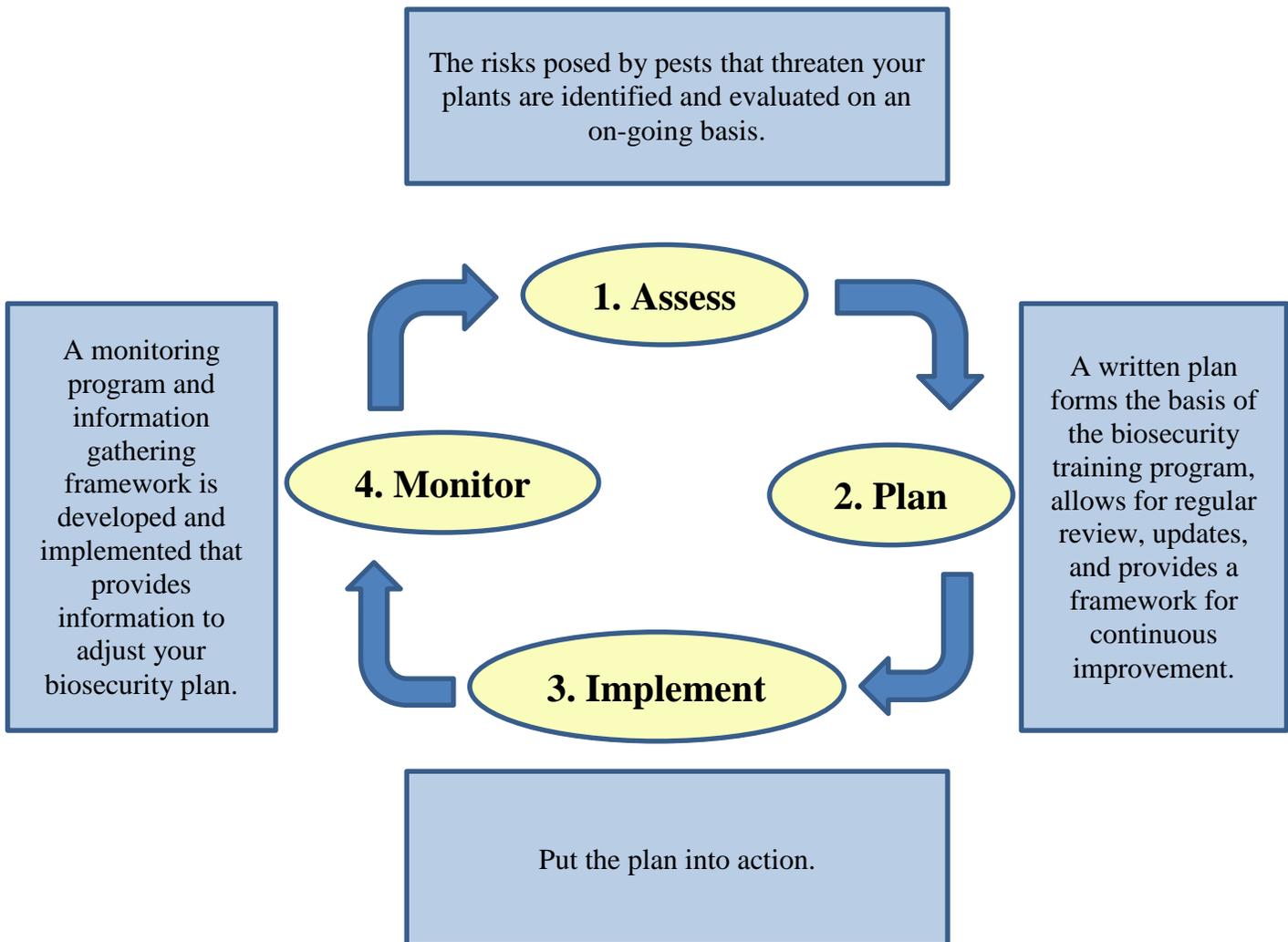
The development and implementation of your biosecurity plan can be seen as a cycle of activities:

- 1) **Assess** pest risks and reassess on an on-going basis to ensure continuous improvement;
- 2) **Plan** to address biosecurity gaps:

- 3) **Implement** measures and procedures; and
- 4) **Monitor** and gather pest information.

Figure 2 provides a visual representation of the cycle of biosecurity activities, where the need to assess and reassess can be seen as both the starting point of the cycle as well as the activity that continues the cycle. Creating your biosecurity plan is a preventative approach to managing pest risk within your farm. By assessing and re-assessing pest risk on a regular basis, continuous improvement can be achieved and activities which were once reactive become measured and predictable.

Figure 2: An illustration of the activities to follow to develop and maintain your biosecurity plan



- **Assess:** Identify and evaluate the risks of pest introduction, and analyze their transmission pathways. This will allow for current biosecurity gaps within your farm to be identified and addressed. Production practices should also be reviewed frequently (re-assess) to ensure that implemented measures are effective in relation to pest prevention and control.
- **Plan:** A written biosecurity plan is highly recommended. A written plan allows for regular review and update, facilitates continuous improvement within the farm and forms the base for training. Note: The self- assessment tool (Appendix 1) provides a framework or starting point for the development of your biosecurity plan.
- **Implement:** Put the plan into action. Education, training and communication are key to implementing a biosecurity plan.
- **Monitor:** Create an information gathering system that identifies emerging pest risks to your farm. This system should include the implementation of a **monitoring program** that will identify pests that may be introduced to your farm. It is important that the design, effectiveness and implementation of a biosecurity plan be assessed not only on a routine basis but also when changes in farm practices or biosecurity threats occur.

3.0 Develop your Biosecurity Plan

3.1 Information

Your biosecurity plan should include an information gathering system to allow you to identify the current and potential pest risks to your trees or plants as well as the pathways of transmission. This system should include:

- 1) A communication network to:
 - gather information from sources including local agrologists, extension workers, researchers, fellow producers and producer associations
 - identify critical points to apply biosecurity intervention that will mitigate the risks associated with pathways of transmission; and
 - help identify pests on your farm.
- 2) A federal, provincial and municipal contact to provide information regarding:
 - regulations and changes to regulations;
 - requirements for inputs and outputs;
 - specific criteria of other farm level programs (for example: Integrated Pest Management or CanadaGAP™); and

- requirements for market access that are in addition to and may be more stringent than regulations.

3) Farm layout information to:

- use specific routes for the movement of inputs, people, vehicles, equipment and outputs;
- post signs to assist with directing traffic flow and increase awareness of designated areas;
- illustrate the layout of your farm (map) including designated areas to assist in training new employees, directing visitors and service providers, planning future production processes and managing pest detections.

Gathering information will be an on-going process that will allow you to adjust your biosecurity plan to mitigate risks as they are identified.

3.2 Identification

There are many insects, viruses, bacteria, fungi, weeds, nematodes and phytoplasma that can impact fruit and tree nuts. The types of pests that are identified as a risk to your plants will depend on several factors, including:

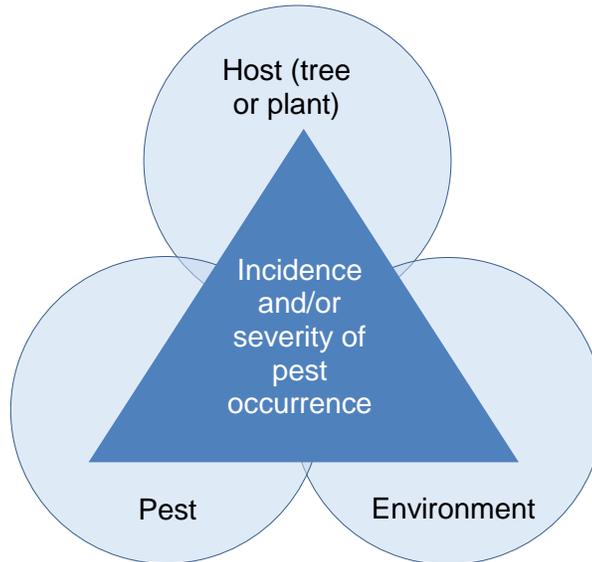
- the type of trees or plants being grown;
- the potential for pest introduction;
- region;
- climate; and
- production practices.

To effectively control or contain a pest it must be correctly identified and the pathway of transmission must be understood. The implementation of proactive biosecurity measures can mitigate the potential for introduction and spread of pests if applied to a critical point in the pathway of transmission.

Wind-blown pathogenic spores and insects may travel far distances creating a challenge to the control and prevention of the introduction of pests onto your trees or plants. As long as you are growing trees or plants, complete pest prevention is not possible in all situations. Reducing the potential for pest introduction and spread is the next best option as it can be challenging to eradicate or control a pest once it has been introduced to your farm.

Figure 3: The Plant Pest Triangle

Figure 3 illustrates the relationship between a pest, tree or plant host and the environment.



The establishment of a pest requires the interaction of a susceptible host (tree or plant), a pest and an environment favourable for pest development. Environment can influence the relationship in the following ways:

- increase or decrease pest survival;
- detrimentally affect the health of the plant and increase susceptibility to pests; and
- wind and water can be a pathway of transmission.

The introduction or severity of a pest occurrence can be mitigated with proactive biosecurity measures such as the selection of resistant varieties or influencing the impact of the environment.

3.3 Pathways of Transmission

The implementation of proactive biosecurity measures can mitigate the potential for introduction and spread of pests if applied to a critical point in a pathway of transmission. Pathways of transmission include:

- **Biological and mechanical vectors:** insects, birds, animals, plant material and organisms in soil; and
- **Physical pathways:** people, vehicles, tools, equipment, irrigation, harvest containers, inputs (for example: propagation material, plants, soil, mulch) and outputs (for example: pruning debris, unharvested fruit, fruit waste, and packing materials).

Knowledge and analysis of pest transmission pathways allows for the identification of the critical control points where biosecurity measures should be implemented.

Table 1: Example of Analysis of Transmission Pathways for Fruit and Tree Nut Pests

Pests	Stock plants/nursery	Soil/Mulches	Air	Water	People	Common Vectors	Other pathways
Aphids	✓	✓	✓		✓		Alternate hosts, machinery
Mites	✓		✓		✓		Pruning and plant debris
Brown rot	✓		✓	✓		Insects	
Bacterial canker	✓			✓			
Botrytis	✓		✓	✓			
Crown gall	✓	✓					Tools, machinery
Weeds	✓	✓	✓	✓			Birds, animals, manure, vehicles

3.3.1 Biological and Mechanical Vectors

Target Outcome:

Implementation of biosecurity measures at the critical points in the pathway of transmission of biological and mechanical vectors.

The following are some examples of biological and mechanical pathways:

- Insects can serve as pathways to introduce viruses and bacteria;
- Birds and mammals can spread weeds via feet, feces and fur.
- Neighbouring crops may serve as a host for pests that may infect your trees or plants.

Benefits

Reduce crop damage, increase productivity and minimize economic losses through the implementation of biosecurity measures that disrupt the pathways of transmission.

Considerations

- Prevent wildlife from entering your production area. The use of fencing or tree guards that wrap around the trunk of the tree can minimize or deter wildlife from causing physical damage to your trees or plants.
- Manage vectors (for example; aphids, leafhoppers, mealy bugs, scales, and nematodes) with management practices such as chemical, mechanical and **biological controls**. Under some circumstances, control measures can negatively impact beneficial insects.
- Fallowing of production areas or crop rotation may mitigate the build-up of pests that can occur when one species is continuously grown in a production area. These best management practices can interrupt reproduction cycles of pests including nematodes by not replanting or by planting non-host trees or plants.
- Identify potential host trees or plants within and around your production areas and remove or implement control measures for these potential hosts.
- Locate your production areas away from neighbouring crops that may be potential hosts or vectors of pests.
- Remove or eliminate pruning debris from production areas.
- Locate compost piles away from production areas as they may serve as homes for unwanted animals and pests.
- Dispose or manage infected fruit, nut or plant debris to control pests. Compost can be an effective way to dispose of infected material if done properly. Infected material that is not properly composted properly can be a significant source of pests.²

² Restrictions may apply to the disposal methods of federally, provincially or municipally regulated pests.

- Pollinators such as bees may be a pathway of viruses (for example: Blueberry Shock Virus). It is recommended to work closely with your pollinator provider to follow good management practices³.

3.3.2 Physical Pathways

Inputs, people, equipment, tools and vehicles can be a potential source of pest introduction and spread onto your farm. On the other hand, outputs can present a risk of introduction and spread to other areas from your farm. It is important to implement biosecurity measures that will mitigate these risks and help break the cycle of pest transmission on your farm.

1) Inputs

Target Outcome:

To eliminate inputs as a potential source of pests.

Receiving inputs such as nursery stock, compost, manure, fertilizer, mulch, soil, single use packaging materials or water has the potential to introduce pests to your trees or plants.

Your biosecurity plan should have protocols that mitigate the risks associated with moving inputs onto your farm.

Benefit

By ensuring inputs are obtained from a reputable source the introduction of pests to your farm can be mitigated.

Considerations

- Ensure that nursery stock that arrives on your farm are from reputable suppliers and certified for freedom from pests when available as signs of viruses, viroids and

³ For more information on bee biosecurity refer to the National Bee Farm-Level Biosecurity Standard <http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/bee-industry/eng/1365794112591/1365794221593>

phytoplasmas may not be visible on dormant material. Material should also be certified for quality, trueness to type and pest resistance when possible.

- Receive and store inputs in a designated area located away from your production areas to prevent introduction and spread of pests to your trees or plants.
- Inspect inputs for signs and presence of pests prior to accepting or moving the materials into your production areas.
- Ask your compost or mulch supplier for testing history or quality assurances to ensure it is not a source of pests.
- Keep records of when and where compost or mulch batches were used on your farm in the event of a pest detection.
- Ensure manure that is being used as fertilizer has been composted to reduce the risk of pest introduction.
- Include in your monitoring plan observation of areas where compost and manure has been applied to identify symptoms of pests.
- Do not move soil between farms or designated areas. Soil is considered to be a high risk pathway for spreading a wide range of pests (for example: bacteria, fungi, insects, nematodes and weeds).
- Know the previous use of recycled harvest containers to identify possible pathways of pest introduction.
- Know the source, availability and quality of water applied on your production area. Water availability and quality are important considerations for healthy trees or plants and soil as contaminated water can alter the composition of soil and also present food safety risks.
- Prevent livestock and animal access to water sources used for irrigation or filling sprayers.
- Water supply trucks and systems should be properly maintained, cleaned and **disinfected** where there is a risk of contamination.
- Maintain purchasing, production and storage records for all inputs. Records of the source of an input, numbers of plants and date planted can be important when responding to a pest detection. Records form the basis to identify the source of origin and potential distribution of a pest.
- Recycled harvest containers, transport containers and packaging materials:
 - Clean and disinfect recycled harvest containers and transport containers between uses in a designated area located away from production areas.
 - Designate a clean packaging area.
 - Consider the risk of re-using packaging materials that cannot be cleaned and disinfected between uses as this increases the potential for pest introduction and spread.

- Designate a production area specifically for recycled harvest containers, transport containers and packaging materials.

II) People

Target Outcome:

Employees, visitors and service providers are informed and respect applicable biosecurity protocols.

Benefit

Managing the biosecurity risks associated with the movement of people between farms and designated areas can mitigate the risk of pests that can be carried on footwear, clothing and hair.

Considerations

- Employees should be trained on the biosecurity protocols for your farm, refer to section 4.0 Training and Communication for information.
- Visitors and service providers should report to the office or have farm employee meet them in a designated area to receive a briefing on the biosecurity protocols, access to supplies, and assistance to implement the protocols.
- Visitors, service providers and employees should park in designated areas and only access areas necessary for their activities as their vehicles can carry pests.
- Keep a visitors log to identify the date visited, the areas visited and the last contact with fruit and tree nuts prior to visiting your farm. This information may be useful when responding to a pest detection.
- Ask visitors and service providers if they have visited another farm that day as clothing, footwear and hair can carry pests that may have been present on another farm.
- Ensure visitors, service providers and employees who have been on other farms do not have soil or plant debris on footwear, clothing or hair.

III) Vehicles, Tools and Equipment

Target Outcome:

Vehicles, tools and equipment are cleaned prior to entry and kept clean to prevent the introduction and spread of pests on your farm.

Vehicles, tools and equipment entering and moving within your farm pose a biosecurity threat as they can be contaminated with soil and plant debris that can harbor pests.

Non-agricultural vehicles and equipment that enter and conduct activities not related to your production may also pose the same pest risk. For example;

- earth-moving equipment;
- gas exploration equipment;
- utility service vehicles; and
- delivery vehicles.

It is important to recognize that if they are on your farm it is likely they have been on other farms.

Considerations

- Establish designated parking areas for visitors, employees and service provider vehicles.
- Minimize traffic movement into farm production areas.
- Inspect vehicles, tools and equipment for soil, plant debris, organic material and insects and if necessary clean and disinfect prior to entry and movement between farms or designated areas.
- If off-farm vehicles must be used on your farm, restrict them to designated access roads and prohibit access to production areas. Ensure that the vehicle is free of soil and plant debris if entry is required.
- Prevent the entry of recreational vehicles on the premises, particularly into production areas.
- Ensure that vehicles follow the appropriate routes and traffic-flow patterns as established. Move from clean production areas to those more likely to harbour pests or potential biosecurity risks.
- Clean pruning and propagation tools between areas where pest transmission is a concern.

III) *Outputs*

Target Outcome:

Product leaving the farm is free of pests of concern.

By-products or waste are disposed or treated to reduce the risk of spreading pests.

Outputs can be categorized into two distinct types:

- 1) The final product which should be free of pests of concern; and
- 2) By-products or waste which may contain pests when leaving the farm and require specific disposal or treatments to mitigate the release of pests to areas surrounding your farm and neighbouring farms.

Although outputs can be categorized into two distinct types both pose the same risk of pest introduction or spread to the areas surrounding your farm and to neighbouring farms.

Benefit

Managing outputs mitigates the potential risks associated with infestation and re-infestation of your farm as well as potential infestation of neighbouring farms, other crops, and the environment.

Considerations

- Know the pest regulations for the intended market of your final product to ensure it can meet phytosanitary certification requirements.
- During the growing season and at the time of harvest monitor for symptoms or the presence of pests on trees or plants and the fruit or nuts.
- Follow established industry protocols for grading, labelling and segregation of final product as these are biosecurity activities that mitigate the risk of spreading pests⁴. Conduct these activities in a designated area away from production areas.
- Identification and labelling of final product is important for traceability in the event of a pest detection, spray residue issue or food-borne illness.
- Dispose or manage infected fruit, nut or plant debris to control pests. Compost can be an effective way to dispose of infected material if done properly. Infected material that is not properly composted properly can be a significant source of pests.⁵⁶

⁴ Contact your industry representative or CFIA for more information regarding established grading, labelling and segregation protocols such as the Canadian Agricultural Standards Product Act.

⁵ For further information on proper composting please refer to <http://www.omafra.gov.on.ca/english/engineer/facts/05-023.htm>

⁶ Restrictions may apply to the disposal methods of federally, provincially or municipally regulated pests.

- Dispose of culls, fruit and nut waste by deep burial, transportation to a municipal disposal facility or other methods that minimizes the risk of pest spread and introduction.
- Locate compost or cull piles away from production areas.
- By-products should be transported in leak-proof, clean bins to prevent the leakage of juice as it may contain pest larvae.
- Know the pest status of the region(s) receiving your product. Additional biosecurity measures may be necessary for regions that are free of a pest that is present at your farm.

3.4 Pest Monitoring

Target Outcome:

Minimize production losses through the early detection of pests.

Implementation of a monitoring program on your farm will help to ensure that pest introductions or threshold limits are identified quickly and the potential for economic and ecological issues is lowered significantly.

Benefits

Early detection is vital to minimize the impact and to successfully contain or eradicate pests. Early detection of pests through regular monitoring leads to the implementation of management practices or specific pest **response plans** before pest population impacts market access, local economic losses and the environment.

Considerations

- Your monitoring program should include activities to identify both existing and potential pests of concern. Use your information gathering system to continuously be aware of emerging pests.
- Incorporate the knowledge of the pest **life cycle** specifically the stages of development, where they are found and the symptoms exhibited into your monitoring program.
- Correct identification of pests will help you determine the most appropriate and effective controls.
- Know the risk of each pest and analyze the results of your pest monitoring as not all pests will carry the same risk.

- A monitoring program should include routine observation of production and shipping areas for signs of pests.
- Keep records of monitoring protocols, observations and responses. Reviewing these records is an essential step in evaluating and developing response plans.

When monitoring has identified signs of pests take action to correctly identify the pest and evaluate the risk in order to take appropriate action.

3.5 Response Plan

Target Outcome:

The evaluation of the pest risk is used to develop your response plan.

When a common pest that is not regulated is detected there is a decision making process that involves analysis to determine if a response is required, the timing of the response as well as identification of the most appropriate control. When a pest is found control actions may not always be required as not all pests carry the same risk. The economic and ecological implications should be assessed when deciding whether to respond to a pest detection on your farm. The decision of whether to manage or control a pest will depend upon factors including but not limited to:

- biology of the pest;
- availability of control measures;
- cost and benefit considerations; and
- regulatory status of the pest.

Identification and quantification of pests identified through your monitoring program provides the information to enable you to decide if you have reached your **treatment threshold**. A threshold is the critical point that you have decided a level of pest population may result in unacceptable economic or ecological loss. Thresholds are very specific and may fluctuate depending on crop, pest, growth stage of the pest, expected market value and cost of control. With so many factors to consider it may be difficult to establish thresholds. Information is available from your grower organization or provincial specialist to help you determine thresholds specific to your crops and pests of concern.

Benefits

Establishing a threshold and preparing detailed response plans prior to the identification of a pest may facilitate an effective response which may reduce economic loss and ecological impacts.

Timely pest identification, containment or eradication can mitigate the risk of disruption of domestic or international markets.

Considerations

- Preserve samples to allow for accurate identification of pests.
- Use laboratories, extension specialists, researchers and the Canadian Food Inspection Agency (CFIA) for confirmation of pest identification.
- When a regulated pest is identified the CFIA and your respective provincial or territorial government must be contacted to report the detection. If you suspect you have detected a regulated pest it is important to limit the potential spread of the pest through the control or restriction of movement of plant and fruit material as well as people and equipment in and out of the infected area on your farm.
- Contact your industry organization(s) for your commodity group, to determine if it is necessary to implement a **Crisis Management Plan**.
- Record the location of pest detections as this is important for immediate response or control.
- Use signage to indicate the location of pest detections, where applicable.
- Where there is a risk of transmitting pests of concern, implement controls to clean and disinfect equipment between farms or production areas within your farm.
- It is essential to include the response procedures as part of your employee education and training (refer to section 4.0 for further information).
- Clean and disinfect vehicles and equipment upon exiting the **infested area** to prevent spread of the pest.
- Clean and disinfect vehicles and equipment entering your farm if a pest risk has been identified in the vicinity of your farm.
- If possible, dispose of plant debris and waste on the infested production area to prevent spread. Methods of disposal onsite may include burning or deep burial. If material cannot be disposed of onsite it should be contained for transport to a municipal disposal facility.

- A spray control management plan may be required to reduce pesticide resistance. This strategy should include regular rotation of sprays, application of the most effective spray, correct timing of the application and monitoring to ensure the effectiveness of the treatment.

4.0 Education, Training and Communication

Target Outcome:

People entering or working within your farm respect the biosecurity measures in place.

Education and training should be provided to all visitors, service providers and employees that are entering or working on your farm. Training protocols provide information regarding the biosecurity measures in place on your farm to prevent transmission of pests. Training protocols should be reviewed regularly and updated when emerging risks are identified, new technology or knowledge is available or operational practices change.

Benefits

A well developed, communicated and implemented training program will provide visitors, service providers and employees with an understanding of the importance of proactive biosecurity.

Considerations

- Incorporate your biosecurity protocols into your training program.
- Make a copy of your biosecurity plan accessible to employees.
- Visitors should be accompanied by an employee to assist them in respecting your biosecurity plan.
- Ensure that visitors and service providers respect the biosecurity measures for the areas of your farm they will visit.
- Schedule and implement periodic training and awareness updates with your employees.
- Monitor, review and change your biosecurity plan and training program as situations change and new information becomes available.
- Ensure employees are trained and supervised in the handling and proper application of crop protection products.

5.0 Site Selection: Geography, Location and Layout

Target Outcome:

Use knowledge of geography, location and layout to plant new sites and to protect existing or neighbouring sites.

An important management decision is the selection of a location to establish a production area as choosing the most appropriate site may make biosecurity and production practices easier. Potential sources of biosecurity threats may be neighbouring sites (operating or abandoned), nurseries, other commercial plantings, native vegetation and urban plantings. Aspects of geography (for example: elevation or topography), environmental factors (for example: water availability and wind direction), location and layout may contribute to the health of trees and plants. Knowledge of the history of land use is also vital to ensure the land is compatible for your intended use (not a landfill site, toxic waste, presence of pests in the soil). When choosing a new location for a production area, consider drainage, neighbours, neighbouring land uses, exposure, local plant life, proximity to water and weeds.

Benefits

The integration of all knowledge when choosing where to plant will help optimize the chance of success to meet planting objectives.

Considerations

- Evaluate existing sites to identify biosecurity risks and implement measures to mitigate those risks.

Geography and Environmental Factors

- Plant on sites that have reduced risk of pest introduction by the prevailing wind direction as wind can carry spores or insects.
- Select sites that are free of the pests of concern.
- Make use of topography to assist with drainage and reduction of standing water in production areas.
- Assess soil conditions including subsoil compaction and water holding capacity to ensure optimum drainage.
- Consider water availability and accessibility.
- Ensure the climate is compatible for the type of fruit or nut that will be grown.

Location

- Neighbouring land uses such as livestock and poultry operations, or non-farm uses (for example: dumpsites and industry refineries) can have the potential to contaminate your fruit or nuts and/or have a negative effect on soil condition.
- Identify potential host trees or plants within and around your production areas and remove or implement control measures for potential hosts.
- Locate your production areas away from neighbouring crops that may be potential hosts or vectors of pests.
- Management practices of neighbouring sites can have an impact on your management strategies. For example, the use of pesticides may reduce populations of beneficial insects
- To assist in managing access to your site, consider the use of natural barriers such as roadways or neighbouring farm boundaries (for example; windbreak or hedge).
- Conduct an assessment of the history and previous use of newly acquired or leased land. This will provide knowledge of the pests which might be of concern, and will also provide information on the potential build-up of chemical control products.

Layout

- Designate an area located away from production areas to clean and disinfect tools, equipment, boots and vehicles prior to entry to the production areas
- Locate debris and compost away from production sites to prevent pest introduction and spread.
- Locate designated receiving areas for inspection of inputs (for example: nursery stock) away from production sites. The receiving area should also allow for cleaning and treatment, if necessary.

6.0 Glossary

Biological control	Biological control is a component of an integrated pest management strategy to reduce pest populations through the use of natural enemies such as predators (for example: predatory mites), parasitoids (for example: wasps), and pathogens (for example: bacteria).
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Biosecurity	A series of management practices designed to reduce the introduction of pests onto a farm (bioexclusion) and to minimize their spread within the farm and beyond (biocontainment). ⁷
Biosecurity plan	A written procedure of designed practices to prevent, minimize, control, and contain pest movement onto, spread within and off a farm. The plan is farm specific.
Crisis Management Plan	A plan which describes actions to be taken in the case of a major event (likely pest related) that may threaten to harm an operation.
Disinfect	To cleanse materials, equipment and surfaces of pests and any substance which could harbor a pest, for example, soil.
Infested area	Presence in an area of a living pest of the plant or plant product concerned. Infestation includes infection. ⁸
Integrated Pest Management ⁹	Integrated Pest Management (IPM) involves the use of several control tactics based on knowledge of the crop, pests and associated natural enemies to avoid crop loss and minimize harmful effects on the environment.
Life cycle	The series of changes occurring in an animal or plant between one development stage and the identical stage in the next generation
Monitoring program	A scheduled activity to look for the presence or signs of pests. This may include observation of trees, plants, fruits and nuts, trapping, sampling and testing of plant material. The frequency of this activity is dependent on the time of year, the lifecycle of the pests of concern and level of risk.
Pests ¹⁰	Anything that is injurious or potentially injurious, whether directly or indirectly, to trees and plants or to products or by-products of plants, and includes any plant prescribed as a pest, insects, diseases, viruses and weeds.
Response plan	A set of protocols to prepare and respond to a pest problem which allows for a rapid response to the introduction.
Treatment threshold ¹¹	A point at which pest populations, economic considerations or environmental conditions indicate that pest control action must be

⁷ National Farm-Level Biosecurity Planning Guide - Proactive Management of Plants Resources

⁸ IPPC – ISPM 5

⁹ Orchard Pest Management, A Resource Book for the Pacific Northwest edited by Elizabeth H. Beers, Jay F. Brunner, Michael J. Willet and Geraldine M. Warner

¹⁰ The *Plant Protection Act* defines a pest as anything that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants, and includes any plant prescribed as a pest. The International Plant Protection Organization (IPPC) definition of pest is as follows: Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products.

¹¹ <http://www.epa.gov/pesticides/factsheets/ipm.htm#setaction>

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	taken.
Vector	Medium/route of transmission

Appendix 1: Self-Assessment Checklist

Use the checklist below to conduct a self-assessment of the biosecurity measures in place on your farm. Indicate with a checkmark whether the biosecurity measure occurs (Yes), does not occur (No) or is not applicable to your farm (NA). It is recognized that not all measures will apply to each of the various commodities and production types included in the scope of the standard. Carefully evaluate whether a biosecurity measure is not applicable to your farm. Measures that pertain to your farm but are not implemented should be identified as 'No' as opposed to 'Not Applicable'. Completing the checklist will help you to identify areas where biosecurity measures may be required and will help provide a framework for the development of your biosecurity plan. When you have completed the checklist, review your responses. Where you have checked 'No', refer to the related section of the standard and producer guide to develop actions to implement the biosecurity measure.

Date of assessment: _____

Biosecurity Measure	Yes	No	NA	Comments
Section 3.0 Develop your Biosecurity Plan				
An information gathering system has been created to identify current and potential pests and pathways of pest transmission.				
A map of your farm has been developed.				
Pathways of transmission have been analyzed to identify critical points where biosecurity measures should be implemented.				
Section 3.3.1 Biological and Mechanical Vectors				
Pests and vectors are managed with chemical, mechanical and biological controls.				
Potential host trees or plants within and around production areas are removed or controlled.				
Production areas are located away from neighbouring crops that are potential pest hosts.				
Compost piles are located away from production areas.				
Section 3.3.2 Physical Pathways				
Inputs				
Nursery stock is sourced from reputable suppliers and certified for freedom from pests when available.				
Inputs are received and stored in a designated area located away from production areas.				
Inputs are inspected for signs and the presence of pests prior to moving into your production area(s).				
Soil is not moved between farms or designated areas.				
You know the source, availability and quality of water applied to your production area.				
Recycled harvest containers and transport containers				

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are cleaned and disinfected prior to use.				
Purchasing, production and storage records for all inputs are maintained.				
People				
Employees are trained on the biosecurity protocols for your farm.				
Visitors and service personnel are informed of biosecurity protocols for your farm.				
Visitors and service personnel sign a visitors log on arrival.				
Visitors, service providers and employee's footwear, clothing or hair are free of soil or plant debris.				
Vehicles, Tools and Equipment				
Designated parking areas have been established for visitors, employees and service provider vehicles.				
Traffic movement into production areas is minimized.				
Vehicles, tools and equipment are inspected for soil plant debris, organic material and insects prior to entry onto your farm or into designated areas.				
Pruning and propagation tools are cleaned between areas where pest transmission is a concern.				
Outputs				
Trees, plants, fruit or nuts are monitored for pests throughout the growing season and at the time of harvest.				
Grading, labelling and segregation of final product are conducted in a designated area away from production areas.				
Final product is labelled.				
Culls, fruit and nut waste is disposed of by deep burial, at a municipal disposal facility or other method to minimize pest spread.				
Section 3.4 Pest Monitoring				
Your information gathering system is used to remain up to date on existing and potential pests of concern.				
Knowledge of pest life cycles is incorporated into your monitoring program.				
You have knowledge of pest risks and analyze the results of your monitoring activities.				
Records of monitoring protocols, observations and responses are maintained.				
Section 3.5 Response Plan				
Laboratories, extension specialists, researchers and the CFIA are used to confirm pest identification.				
The CFIA, provincial or territorial government is contacted when a regulated pest is detected.				
Employees are educated and trained on the response procedures to pest detections.				
Equipment is cleaned and disinfected between farms or production areas.				
Plant material is disposed of within the infested production area by burning or deep burial.				
Material that cannot be disposed of within the production area is contained for transportation to a municipal disposal facility.				

Section 4.0 Education, Training and Communication

Your biosecurity protocols are incorporated into the training program.				
Changes to your biosecurity plan and training program are made as new information becomes available.				
Employees are given periodic training and awareness updates.				
Visitors are assisted by employees in respecting your biosecurity plan.				

Section 5.0 Site Selection

Geography and Environmental Factors

Sites that are not at risk of pest introduction by prevailing wind direction are chosen for planting.				
Sites chosen for planting are free of pests of concern.				
Topography is used to assist with drainage and reduction of standing water.				

Location

Potential host trees or plants within and around production areas are removed or controlled.				
Production areas are located away from neighbouring crops that are potential pest hosts.				
An assessment of the history and previous land use is conducted for newly acquired or leased land.				

Layout

Designated areas for cleaning and disinfecting tool, equipment, boots and vehicles are located away from production areas.				
Debris and compost are located away from production areas.				
Areas designated for the inspection of inputs are located away from production areas.				

Appendix 2: Acknowledgements

- Agriculture and Agri-food Canada
- British Columbia Blueberry Council
- British Columbia Cranberry Marketing Commission
- British Columbia Cherry Association
- British Columbia Fruit Growers' Association
- British Columbia Ministry of Agriculture
- Canadian Horticultural Council
- Fédération des producteurs de pommes du Québec
- Food Processors of Canada
- Grape Growers of Ontario
- Ministère de l'Agriculture des Pêcheries et de l'Alimentation
- Ontario Berry Growers Association
- Ontario Hazelnut Association
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Tender Fruit Growers
- Perennia
- Plant and Animal Health Branch
- Society of Ontario Nut Growers (SONG)
- University of Guelph, Berry and Tree Nut Research
- Wild Blueberry Grower Association of New Brunswick